3

of animal life continued

Death which ensues from fasting is not occasioned by the Absence of the Stimulus of food, or blood. Dissections shew no defect of the latter in the large ~~blood vessels~~ veins. It is brought on wholly by the excessive ~~stimulus~~ impression of the ~~as~~ acting stimuli which I have mentioned. ——

The Absence of the Stimulus of food in ~~diseases of~~ fevers and other diseases of long duration is supplied by the blood acting upon the highly, or artificially excited blood vessels, Stimulus of Pain from all its various causes, — by heat ~~as~~ in febrile diseases, — and by stimulating Drinks and medicines. —— In madness the Absence of the stimulus of food when it occurs, is supplied by

the stimulus of morbid 93 action in the blood vessels of the brain, by false perceptions in the understanding, or by unruly passions. —

4 We come now to a most difficult inquiry, and that is, how is life supported in that total abstraction of external & internal stimuli which takes place in asphixia, or drowning, or freezing — I answer, it by observing that perfect life consists in two things viz: excitement and irritability. They are as we shall say hereafter, frequently exchanged into each other. For supposed sudden deaths from grief - joy - or drowning there is a sudden abstraction of excitement,

to

but the excitability remains for minutes, - and it is said for even hours afterwards, ~~according to~~ if the destruction of the excitement has not been attended by any injury to the organs of the system, nor by great degrees of ~~terrors~~ fear or terror, ~~both of which~~ or by such exertions of the body as waste the excitability. For ~~of~~ example - if a persons falls from a great height into the water ~~so~~ so as to bruise himself by his fall, - or if he ~~is~~ survives a fall into the water, long ens to give his fears time to act upon ~~his~~ his system, - and above all, if he has ~~attempts~~ perished after attempting to save himself by

swimming for half an hour or an hour, there can be but little hope of his recovery, for the organization of the body is destroyed in the first instance, and in the two latter instances, the excitability of the system is entirely dissipated, - so that the stimuli which preserve life have nothing to act upon. - I shall illustrate my meaning, by a familiar example. - Suppose the wick of a candle to be dipped in a vial of Ether, be afterwards to be exposed to the Air. The Ether in this case is the excitability of the candle. The ~~wick~~ candle in its sound state is its excitement, now if a ~~two~~ lighted candle be brot in contact with the

vapor of the Ether, ~~which~~ it immediately takes fire, and communicates its blaze to the wick of the candle. But if this wick, or the tallow of the candle have been deprived of their inflammability, for which ~~excites~~ answers to the excitement of the body) by being previously wetted with water - it will be impossible to excite ~~a~~ them into a flame. The Ether in this case will be consumed or wasted, but it will make no impression upon the candle. - This ~~illustration~~ simile will apply further, & serve to illustrate the volatile nature of the excitability of the body, when it is deprived of ~~the~~ its constant resource in the excitement of the system. ~~Ha~~ To inflame

The stimuli which act most speedily in this case are gentle heat & exercise, and all such ~~applies~~ others as rouse the lungs & alimentary canal into action. Here then our theory receives new strength - for we here behold animal life - more than presumed - we see it roused by stimuli acting upon the excitab.y of the system, and gradually converting it into excitement. —

the Alter, the lighted candle must be put in contact with it ~~soon after it~~ before it has time to exhale in the air. In like manner - Stimuli must be applied to the excitability of the ~~system~~ body immediately after it is taken out of the water, ~~or if will be~~ otherwise they will be applied in vain. - ~~for it soon~~

In Asphixia particularly in that Species which we call a Trance - the State of the System is nearly the same as in drowning - but this ~~Disorder~~ Phenomenon sometimes comes on in the close of slow fevers which have both reduced the excitement & wasted the excitab.y of the System. How is animal life in this case supported or restored by

v This was evident from heat con-
-bursing near the heart - or from
the body not having acquired the Stiffness
which always accompanies
death. — It is certain they hear
and think - the mind here reacts. see
facts of Jos Rush - The German - & the
annexed extract from Dr Creigton's work.

stimuli? I answer that in all the the amount of trances I have ever heard off, there was reason to believe 1st that no injury had been done to any of the Organs of the body. & 2ly that there were considerable portions of excitab.y - and excitement left in the system. and 3ly that the recovery was effected either by the stimulus of heat - of pure air or by the impulse of a divine communication to the Soul - (as in miraculous resuscitations) indirectly for this last is as stimulating to the body as any of the common reflex actions of the Understanding or passions. In these then as in the former case life is not only preserved, but restored by the action of stimuli. —

It remains yet to inquire ~~in~~ under this head - how is life supported, or ~~supported~~ restored in ~~that~~ Abstraction of heat and in consequence of it, - in that suspension of all the actions of the heart - and lungs? ~~I answer that~~ which takes ~~when the~~ place in freezing? I answer, ~~that~~ when the ~~in~~ cold acts suddenly upon the body ~~before there~~ and in such ~~the is~~ a manner as not to destroy any organic parts - the excitability is accumulated as in the recoverable cases of drowning I mentioned, - and life is restored by the ~~ft~~ stimulus of heat, & of gentle frictions applied to the body. — The heat for this purpose should be accommodated to the

I am so perfectly satisfied that life is suspended only in freezing where it takes place suddenly; that I believe it possible for the body to remain in that state for many years without the extinction of life. In the improvements of philosophy particularly of medicine, which remain yet to be made, I think it probable with Hunter that man will have it in their power to change the age in which they are to live. What think you gent.n of suspending your existence by means of the sudden application agreeably to the Cold idea of Mr Hunter, during the present turbulent state of our world, and bequeating a form of

excitability in the system. That of pumps or Spring water is generally warm even in the first instance! ~~It remains yet to~~ Let us next inquire how for our Theory will apply in explaining the State of Animal life in all the different circumstances in which it exists in the inhabitants of different parts of the Globe, ~~and if certain animals of other Spots of~~

1 For the Indians of the northern Latitudes of America there is a defect of the Stimulus of heat in winter — of ~~regular~~ regular meals ~~&~~ of the Understanding — and among some Nations of all ~~the~~ Emotion — for they hold it disgraceful to shew any outward Signs of anger — joy — ~~&~~ even of tender or domestic affections. This Character of

money to be applied an hundred years hence, to awaken you to behold our world in ~~a~~ that state of order, peace & universal happiness which we have reason to believe ~~the prophets assure us~~ will probably take place within that period of time? —

of the intellects of our Indians, is very contrary to that which is given them by some Travellers, who according as they have embraced the absurd principles of ~~Hel~~ Rousseau, or Voltaire have endeavoured to prove that human nature may become perfect & happy without the aids of civilization or religion. I deny the truth of ~~all~~ these opinions, & what is more, I deny the facts on which they are founded. ~~The~~ An Indian in a cold climate is the most miserable being on the face of the earth - and as to morals, he is half a beast - and half a devil. - He passes ~~always~~ the greatest part of his life in waking or sleeping under the alternate influence of hunger, or gluttony. - But animal life here

does not want a sufficient ~~flow~~ portion of Stimuli. It is kept up by the ~~very~~ violent exercise with which they hunt, and ~~they carry on their de~~ furious passions with which they carry on war & by the extravagant joy with which they afterwards celebrate their exploits in both in their savage dances & Songs. —

2 In the inhabitants of the torrid regions of Africa, - there is a ~~defect~~ deficiency of the Stimulus of the Understanding - & of the passions, also of labor, ~~But their wants~~ for the Earth almost spontaneously produces all ye is necessary for their sustenance. But the weakness of the Stimuli ye have been mentioned, is amply supplied by the heat of the ~~fire~~ sun, - by the

Spices which they mix with their diet, - and by the passion for musical sounds which so universally characterizes the ~~[illegible]~~ African nations.

3 In Greenland - the Sun affords but a feeble stimulus in summer, and during a long winter, he leaves the ~~body~~ human body exposed to the sedative action of the most intense cold. hence the pulse of a Greenlander seldom beats more than 40, or 50 strokes in a Minute. But the absence of this stimulus is supplied by the heat of their stove rooms, by the perspiration of their bodies confined by ~~furs~~ garments of hair & furs - and by the peculiar

nature of their ~~food~~ aliment - which consists chiefly of animal food, ~~and~~ of dried fish - and of whale oil. - This last article of diet is preferred by them in ~~the same~~ so rancid state - that Crantz informs us that the perspiration &c. they discharge after eating it is so acid, as to render their bodies offensive and even intolerable to an European. - I need hardly add that an aliment possessed of such qualities cannot fail of being highly stimulating. ——

It is remarkable that the diet of all the northern nations of Europe consists chiefly of stimulating animal or vegetable food, and that the use of stimulating spirituous liquors is universal among them.

There is likewise a general defin=
=ency among some classes of them of the
stimulus from the exercise of the
Understanding. —

4 Let us next turn our eyes to the the miserable inhabitants of the East-ern Countries. — Here we behold life in its most feeble state ~~struggling to maintain itself~~ not only from the absence of physical, but of several ~~only against natural, but against~~ other stimuli which operate upon the inhabitants of other parts of the World. Among the poor people of Turkey there is a general deficiency of aliment. — Mr Volney in his truly philosophical travels informs us that the diet of the Bedouins in Syria "seldom exceeds six ounces in a day, & that it consists of six or seven dates soaked in butter milk, and afterwards mixed with a little sweet milk, or Curds". — But this not all — The despotism of the Government of Turkey, ~~in all its extent~~ annihilates weakens

~~domestic, and~~ or annihilates all that extensive force of stimuli which arises from the exercise of the domestic & public Affections. — A Turk lives only to himself. ~~and to the moment in which~~ In point of time he occupies only the moment in which he exists — for his posterity ~~he exists.~~ — ~~He also hopes for no fear,~~ as to life & property belongs wholly to his ~~his belongs~~ ~~and hopes for nothing beyond the present moment~~ master. — Fear is the debilitating principle of his Actions, and hope and joy ~~which contents~~ never add ~~one~~ a single pulsation ~~motion~~ to ~~the~~ his heart. ~~The~~ Tyranny men imposes a ~~press~~ restraint ~~upon~~ the stimulus which arises from conversation, — ~~and~~ for when they speak Volney tells us it is with a slow feeble voice — as if the lungs ~~were affected with the~~ wanted strength to propel air into the glottis to form distinct Articulate Sounds. But the

effects of the absence of the stimuli that have been mentioned do not stop here. "~~They~~ The same traveller adds that they are slow in all their motions" - that their pulses are small - that they have small evacuations - that their ~~blood~~ blood is so destitute of serosity, that nothing but the greatest heat can preserve its fluidity - and that they are rather active, ~~and~~ than vigorous - but that under all these circumstances of deficient stimuli they are still healthy." This should not surprise us, for health and even long life do not depend so much upon the strength of the Constitution as upon a due & exact proportion being kept up between the ~~the~~ Quantity of Strength & the Number and force of Stimuli which act upon it.

The absence of all the stimuli which I have mentioned in the Turks is supplied by 1 the heat of this Climate — 2 by their universal passion for musical sounds — 3 by their equally universal passion for drugs. — 4 by their ~~ardor of~~ fashionable and Universal ardor in the pursuit of Venereal pleasures, and 5 by the general use of Coffee or Opium. —

5 Many of the observations which have made upon the Inhabitants of ~~Turkey~~ Africa, and of the Turkish dominions apply to the inhabitants of China & the East Indies. — They want the stimulus of animal food in many instances, ~~and~~ as well as those which arise from the exercise of public affections. But they are ~~been~~ supplied by — 1 by the heat of climate in many places. 2 By a vegetable

aliment which abounds with nourishment ~~particulars~~ viz: Rice - and Beans. 3d: by the general use of tea in China, & of a stimulating Coffee made of the dried & toasted ~~tea~~ seeds of the Stramonium in the countries in the neighbourhood of the Indian Coast. Some of these nations chew ~~not~~ likewise strong stimulating substances as we do tobacco. —

Among the poor and miserable in the ~~middle~~ nations ~~of~~ who inhabit the middle & southern parts of Europe the deficiency of wholsome ~~& nourishment~~ the stimulus of food - of clothing & of bed - & the want of ~~labour~~ liberty - ~~and~~ ~~the~~ ~~are~~ is in part supplied ~~by the~~ in some countries by the invigorating influence of the Christian religion upon animal life - and in others,

It is remarkable that the use of each of these stimuli is greatly influenced by the circumstances of climate. In cold climates where the earth yields its increase with reluctance, & where vegeta-ble aliment is scarce, - the deficiency of that distention which it is principally calcu-lated to produce, is sought for in the stimulus of ardent spirits. To the Southward of 40° the deficiency of ~~all the~~ stimulus of aliment is sought for in onions - garlic - or Tobacco. But further - a uniform climate calls for more of these artificial stimuli than a variable One - for the alternate action of heat - cold - winds & rain upon the body, supplies their place. A Savage, ~

by — the general use of Malt liquors, tobacco, coffee - garlic - onions ~~and~~ Opium & and Ardent Spirits. ✓

In no part of the world is Animal life as far as it respects the human species in a more perfect State - than in France, Britain Ireland - and the United States. ~~The inhabitants of~~ with all the external and internal stimuli which have been mentioned, the inhabitants of those countries ~~they~~ enjoy the additional stimulus of freedom. — How ~~innumerable~~ numerous & wonderful are Dr Holler says - most longevity in Brit & Ireld. p. 107 the actions of life, to which men are prompted by ~~the~~ the love and possession of ~~the transcendent blessings of~~ liberty! — But to produce the most salutary influence on the system, it is necessary ~~that it~~ this passion should be exercised in a Republic. — There is an indissoluble Union between moral - political - & physical Good, and had I been convinced

vol 8 p 2.

and an ignorant life calls alike for these stimuli
~~There is few stimulus introduced among mankind by agricultural or commercial establishments alike upon the~~
more than a life which is enlightened & civilized - hence the inordinate attachment of the Indians to Rum & Tobacco. It would seem from these facts that man cannot exist without Sensation of some kind, & that when it is not derived from natural stimuli, it will always be sought from such as are artificial. —

~~Exploits performed by the french armies will during their present wars, will prove establish the truth as to the Gravity of life to be greatest & the history of the state of Connecticut will ~~establish the truth of the~~ prove its duration ~~of human life being~~ to be longest in a republican state.~~

that a republican government was ~~not~~ most favourable to industry - morals - and political happiness, I should have in=
=ferred a priori that it must be most favourable to animal life — But - I shall not ~~in a future lecture~~ suffer this interesting question to rest upon analogical induction. ~~I shall~~ I hope here=
=after to prove that ~~there is the greatest~~ animal life ~~quantity of~~ human life exists in the greatest quantity & for the longest time in a republican State. The history of the

~~It remains now only to inquire how far the phenomena of animal life in other animals besides man accord with the theory I have endeavoured to establish.~~

~~There is no thing~~

Besides the stimuli which operate on individual nations, and

V 1 The <u>desire of life</u>. This acts nearly alike upon all ages and conditions of mankind, and is a very powerful stimulus in supporting our existence. It is often visible in the prolongation of life in dying parents who send for their absent children. ~~in~~ In many instances have survived of their living under the most improbable circumstances, Untill they have embraced their ~~embraced~~ children, and expiring a few of their hours afterwards. ~~Poisons~~ Sickly Joyless by habitual Often live under circumstances of the greatest ~~danger~~ weakness till they reach their native shore, & then breath their last in the bosom of their friends. This <u>Desire of life</u> by its vehemence, often turns the scale in favor of ~~life~~ a recovery in acute diseases, and the chance is always in favor of a recovery in proportion to the anxiety a patient discovers to live. Africans we are told died by a voluntary Abstinence

which are influenced by local, or political circumstances, there are certain mental stimuli which operate in ~~different~~ equally alike upon the individuals of all the nations of the world. — These are V

2 The ~~love of money~~ love of money. It is peculiar to this passion to set the whole machine of Society in motion. Hearts which are insensible of the stimulus of religion - patriotism - love - & even of domestic affections, are excited into action by this passion. The history of the coffee house in the city of Philad^a, between the 10th. and the 15th of aug^t. in the year 1791 will bring ~~be remem~~ behold

from food in five days. — ~~witness~~ In his Wm Hamilton in his Acc^t of the Earthquake at Calabria ~~tells a fact~~ relates a fact of a girl who lived 11 days without food. In the former case life was shortened by ~~the wants of those for~~ an aversion from it — in the latter it was protracted by the ~~[illegible]~~ desire ~~of life~~ of it. Story of Brifot — negros — & anim: magnetism.

But further

V. The love of money discovers its stimulus upon the system in a peculiar manner in the games of Cards & Dice. I have heard of a Gent^n in Virginia who passed two whole nights without sleep at a card table — and it is related in the life of the ~~celebr~~ ~~noted~~ major Baggs a noted gamester in Ireland, that "when he was so ill as to be unable to rise from his chair, he was brought to the hazard table, where he has seemed suddenly to revive at the rattling of the dice".

3 ~~Public~~ Amusements of all kinds. — a horse-race — a cock pit — a chase — the theatre —

remembered by contemplative men for having furnished the most ex=traordinary proofs of the powerful stimulus of the love of money upon the human body. — ~~You would have~~ It compared the week of Scriponachia ~~in the month of August 1791~~ ~~I conjecture~~ It produced a fever in one, ~~instances~~ an obstinate wakeful=ness in another — and a mania in a third person ~~who~~ all of whom came under my care as patients. — The ~~who~~ anxiety ~~which was pointed in many~~ of countenance — the quick & irregular motions ~~of~~ the desultory con==versation — & the extempore manner, of all the persons who were inter==ested in this new Species of Speculation gave a truer picture of a ~~madhouse~~ Bedlam or of a hospital, than of a Coffeehouse.

the Circus — & all newspapers —
Levees — tea parties — ~~are all~~ excent are Arti-
-ficial stimulus upon the System, and like
~~the opium among the Turks~~ Rum among
the Indians supply the defect of the stimulus
of thinking. [The Stimulus in ~~the~~ places of
public ~~resort~~ Amusement is varied by the
difference of rank & sex which frequent them.
Homage from an inferior to a Superior, &
a condescending smile from a Superior to an
inferior, — and ~~the~~ flattery ~~from~~ [to that sex
which is supposed to feel it most] ~~are~~
all belong to the artificial stimuli of
Animal life.] —

4 The Love of Dress. ~~[illegible]~~ — This stimulus
is not confined in its influence wholly
male & female
to Coxcombs. ~~and~~ It acts in some
cases upon ~~minds of sound understanding~~ invalids. I have heard of
a gentleman in South Carolina who

6 The Love of fame. This passion acts in various ways, but its stimulus is most powerful & durable in military life. — It ~~[illegible]~~ counteracts in many instances the ~~debilitat~~ debilitating effects of hunger ~~or fatigue~~ cold & labor. It has even done more. It has removed the debility which is connected with many diseases. In several instances which have come within my compass of my knowledge — it has cured the pulmonary consumption. ~~+~~

~~I wished could add here that~~

7 The different religions of the world. ~~Yes — Gentlemen — I hold~~ A religion of some kind ~~to be as~~ is, as useful ~~necessary~~ to

Atheism is the worst of sedatives to the Understanding and passions. It is the abstraction of all faith - hope - & joy - and these we said formerly were two of the more powerful of the internal stimuli. Man is as naturally a religious, as a social and domestic animal.

always relieved himself from a fitt of melancholly by changing his dress, & I believe there are few people who do not feel their spirits invigorated by putting on a new suit of clothes.

Novelty is an immense source of agreeable stimuli - Hence we find new companions - new studies - new pleasures - new modes of business - new prospects - new situations with respect to town & country - or to different countries -

animal life, as it necessary in government. — Religions are more or less friendly to human life in proportion as they elevate the understanding & act upon the passions of hope — and the emotion of joy. It ~~is easy to~~ will readily occur to you all that Christianity when perfectly understood & explained, has immense advantages in this respect over all the religions in the world. It is the natural stimulus of the human mind, as much so as milk and bread are the natural aliment of the body. The love of money — public amusements — the love — the love ~~and the love~~ of fame — of unlawful pleasures — as also the stimuli of tobacco — opium and ardent spirits — are all imperfect substitutes for the gentle — and durable stimulus of the Xn religion upon the system. It even surpasses the effects of the love of liberty, ~~or much~~

and ~~those who are against~~ the same violence is done to the under-standing and affections by depriving them of ~~the~~ a God, that is done to both by ~~a~~ dooming a man to live alone in a cell deprived of the pleasures of social and domestic life. They ~~are~~ egregiously mistake ~~therefore against the evidence of reason,~~ ~~and~~ the nature of man ~~and~~ who ~~attempt to substitute the~~ sup-pose that he can exist without a religion of some kind. The French nation have lately given the most irrefrage-ble proof of this assertion. After rejecting the worship of the true God, they have yielded to the impulses of the human heart in ~~its~~ favor of an object of adoration, by worshipping ~~a~~ human Reason in the figure of a prostitute picked up in the streets of Paris.

The conduct of ~~many~~ nations indi: has proved this in all ages or countries. where the true God has been rejected, Nature, fortune, reason &c in his stead.

all exert an invigorating influence not only upon ~~the~~ health but upon animal life.

V ~~This change in~~ Then shall health and longevity be universal, and ~~a new~~ old age be the only outlet of human life. This delightful change in the animal oeconomy shall be brought about not by refinements in civilization — not by Science — not by liberty — ~~for~~ alas! they have all exerted their influence in vain ~~for~~ not in a word by any thing human Reason can do — ~~by~~ for they have all exerted their influence in vain for that purpose — but by the ~~delicious dew~~ universal prevalence

How long the world may continue to ~~Strangers~~ to this invigorating stimulus proper substitutes is uncertain, but the ~~present appear~~ time must, and will come ~~reason of human affairs encourage~~ ~~us to hope that the time is not very~~ ~~distant~~ when the ~~unbridled~~ passions (if I may be allowed the expression) shall be reduced, and the body & mind of man recover their original order.

Republican forms of government are favourable vehicles of the pure & simple ~~to principles~~ precepts of Christianity, and these are now ~~spreading~~ struggling for birth in ~~this~~ many parts of the Old World. War the source of the military passions is becoming ~~less popular~~ odious in many countries - and even the artificial stimuli of Tobacco - and spirits ~~so up~~ are less in use than formerly

& powerful influence of the doctrines & precepts of the Xn Religion. — I have &c —

~~&~~ ~~There~~ I have hitherto said nothing of the ~~[illegible]~~ influence of comparative situa=
=tions in all countries ~~with respect~~ upon ~~to~~ animal life. I shall only observe here, that country people are exposed to more stimuli than citizens from a purer air - more regular labor - and more natural sounds. - I allude here to the singing of Birds. - ~~to~~ It is remar=
=kable that this stimulus is applied to the ~~sys~~ system when it is most debilitated, that is in the mornings & evenings. In the country the inhabitants of mountains & of some Sea coasts are exposed to more stimuli than persons who inhabit a level country, or who live at ~~at~~ a distance from the sea. In both cases the stimulus arises from pure air.

particularly in Britain - ~~Holland~~ and France & Sweden. ~~The disuse of these Articles~~ ~~shews a~~ Tea & Coffee I have been told are now substituting in the last of these countries, not only in farmhouses, but in taverns to the use of distilled Spirits. The disuse of these loathsome & unnatural stimuli evidently shews a diminution of human misery, and a hostility to more rational & natural stimuli; just as the disrelish to Wine & Bark in the convalescence of a fever, shews a return of the irritability to natural aliment. Thus far - Gent: have ~~Thus have~~ ~~It remains now to~~ I considered animal life as it respects the human species, ~~animals~~, but as I conceive it

v And here Gent: we must extend our ideas of Animal life. The Deity seems to have delighted in Variety in all his works. — Should we discover the Stimuli ~~in~~ ch support life ~~in man~~ ~~we~~ to be weaker in other Animals than in man, we must remember that this is no greater departure from their affinity to man than their having less fire, or beauty, or intellectual powers. —

All Animals more exquisite senses than man except touch.

to depend upon the same causes in different proportions, & differently modified in animals of every species, it ~~we~~ my theory requires that I should apply my principles to explain the state of life in such of them as exhibit phenomena which seem to contradict all that has been advanced upon this subject. —

I observe that all the animals we are acquainted with, even the shell fish — have either ~~lungs~~ hearts — lungs — brains — nerves, or muscular fibres. It is as yet a controversy among naturalists whether animal life can exist without a brain or nerves — but

no one has denied muscular fibres and of course contractibility, or stimulability, to belong to animal life in all its shapes. —

2 All the animals we are acquainted with ~~be~~ require more or less air for their existence. – now this we now to be a powerful stimulus in the support of human life. —

3 They all ~~[illegible]~~ feed upon substances which ~~to their bodies~~ are more or less stimulating to their bodies. It is true some of them take their aliment at long periods. Bruce tells us that he kept two small animals called Jerboas on which the Cerates, or horned Viper feeds, for two years in a vial in

The male frog during its long connection with its female, suffers its limbs to be amputated without discovering the least mark of pain, or without relaxing in its hold of the object of its embraces.

good health without food or sleep. Per=
=haps this period was not more in
this animals life than 24 hours are
to man. Its living without sleep
is a proof ~~of~~ its propping an uncommon posti=
=on of original & natural excitement.
4 They all propagate, & of course feel
the impulse of the venereal appetite.
I shall hereafter mention some facts
from Spalanzani
upon the subject of generation, which
prove that some of those animals in which life
is in a feeble state ~~they~~ feel this stimulus in
a degree to which larger animals are
strangers. — If all the other stimuli
which act upon them, operate
in the same ratio we may account
at once for the degree & duration
of their lives. —

connected with: p 123

They ~~[illegible]~~ all live in a connection to the air. Even the Snail ~~[illegible]~~ draws in air for 7 months under ground this a pellicle or cover which it weaves out of ~~[illegible]~~ on its body, & if it ~~[illegible]~~ makes it too thick, perforates to open a passage to the air. Now Air we said was one of the most powerful stimuli of life. —

But it is possible life may exist in these animals ~~without~~ in the total absence of any impression, or stimulus, provided, the torpid

5 for many animals we behold evident marks of understanding and ~~reason~~ passion. — The Bee & the Ant exhibit many marks of the former, & where is the school boy that cannot bear testimony to the angry passions of a wasp? — ~~&~~

~~6~~ But what shall we say to the history of those animals which pass whole weeks & even long winters in a ~~lapid~~ state in which there appears to be an absence of all the stimuli of heat - aliment - & exercise? - This is a difficult question, but it may be answered. 1 By supposing that they possess a

State we have mentioned be lost or suddenly. In ~~Bats~~ Swallows which sleep this winter in the bottom of lakes & mill dams, the torpor is certainly brot on in this way. —

In other animals it is probable the stimulus of Undigested Aliment keeps up the motion of life, for Mr. Hunter has proved ~~the~~ by an exp^t on a frog, y^t cold below a certain degree checks digestion. — They all live —

[turn back to p: 121

degree of excitability, analogous to the length of the intervals between the times of ~~times~~ eating which we observe in other animals. —.

2 That in some of them - the ferment=
=ing of digestion goes forward during the whole winter in the stomach.
There is ~~an~~ winter animal in Carolina which swallows a pine knot just before it retires to sleep - ~~which do~~ this solid substance is found in a fluid state in its stomach in the Spring. V

[3 The Bear is said to live upon its ~~fat~~ fat during the winter. may not a portion of latent heat be extricated from this fat in its passage from a ~~solid~~ fluid to a ~~fluid~~ solid state, and converted into sensible heat; and may not this sensible heat con=
=tribute to

keep up ~~the~~ some of the motions of life ? ~~✓ go to p. 124~~

1 Let us be careful how we limit our ideas of Animal life. It may consist of motions - too small for our perceptions.

3 Let us be careful - how we limit our ideas of excitability. — It may exist under circumstances, & for a length of time of which we can form scarcely any conceptions: ~~It would there~~

2 Let us be careful - how we limit the force or degrees of Stimuli. In the ~~torpid~~ Hybernation of Animals, the excitability of their bodies may be so much accumu=-lated, or so exquisitely formed as that portions of heat - light - & sound which ~~one degrees of heat and~~ ~~very~~ descend below all calculation may act upon them with ~~the same~~ a force ~~which~~ ~~is a~~ which is scarcely credible. ~~physical life. is it~~ Had we been told ~~but~~ / After admitting the doctrine of

life being the product of all the stimuli that act in the waking state) that it could exist in that state of darkness - silence & inactivity which takes place in sleep, we should have ~~that~~ ~~long~~ found it as difficult to assent to ~~the~~ it, as to the continuance life in certain torpid animals, ~~during a long~~ Sleep I said formerly is a tending to death. The Hybernation of an animal is only a second grade in the scale which marks the progress of life to its ~~dispo~~ extinction in death.

7 We said formerly that Heat was a powerful & universal stimulus in producing animal life. But what shall we say to those animals which live in a cold element, and whose blood is scarcely above that point at which we behold

+ It is very remarkable that the vital powers, or as it might be expressed, the stimulabili-tity of animals is always in proportion to ~~their~~ their defiency of Sentient powers. This is most evident in the polypi which when cut to peices reproduce themselves. — In being cut — it is probable they feel little or no pain. also frogs.

v I might illustrate it still further from the analogy of plants in which life & growth are supported wholly by stimuli — particularly of heat & light — But this belongs ~~to the Professor of Botany~~ another professorship. — I shall only remark that the seed of plant resembles an animal body in having no principle of life within itself. ~~It~~ preserved ~~and~~ in a

the beginning of first? why - that heat & cold are relative terms - ~~and~~ that different animals require very different degrees of heat - and that 32° are ~~[illegible]~~ as stimulating to the bodies of certain ~~fishes~~ animals as 80° or 90° are to the human body. +

Thus first: have I enumerated all the remote causes which produce ~~human~~ animal life, and traced them all the stages ~~of~~ ~~[illegible]~~ and morbid phenomena of this human life, the different nations, and pursuits of men, and this all the classes of animals which inhabit our Globe. ✓

My Object has been simply animal life. Divines tell us that man besides this - has a rational - & a spiritual life. I believe in each of them, & that

drawers for years, or if sunk below the stimulating influence of heat & air it never discovers the least sign of vegetative ~~powers~~ life. This fact has been urged as a proof of a vital principle in

V I consider this, as a striking argument in favor of the ~~separate~~ existence of the Soul in a separate State ~~of existence~~ after death. — the human body, but the explanation that has been given of the only cause of the life of a seed, converts it into a strong argument in favor of the truth of the theory I am now delivering. —

they both exist in a stimulus under certain circumstances upon the human body. — But the animal life which has been the object of our inquiries is capable of existing wholly independant of either of them. Hence we see men who not only live - but enjoy good health who are destitute of reason, & of sensibility in all the moral powers. Witness the infamous Swift whose character is so ably drawn by the Duke of Sully. —

On what part of the system do the stimuli which have been mentioned act? - On the muscular fibres they produce contraction or motion — On the nerves they produce - sensation & in the Brain they produce perception, judgement, & reason, or in other words thought.

perfect

or in other words, life in man consists ~~of~~ in motion - sensation & thought.

~~&~~ & good health consists in the unity or equable diffusion of this motion & sensation ~~to~~ over every part of the body, ~~Disease~~ and in the free and easy exercise of all the faculties of the mind. -

~~a perceptions~~. There may be muscular contraction without nerves – Sensation without thought – and thought without sensa=tion. Mr Hunter's Dissections & many ob=servations fully establish the truth of each of these propositions. – I shall speak more particularly of each of them under the head of the Nervous System.

~~The proximate cause~~ Life then of ~~Life~~ generation is Motion & Thought excited by Stimuli. ~~Life~~ It is as much an effect of impressions upon ~~bodies of specific~~ a peculiar species of matter, as Sound is of the stroke of a hammer upon a sonorous body. ~~Life~~ ~~then~~ It is a quality, & not a principle. This is the natural inference from the facts which I have mentioned. I exclude

as certainly as innate ideas or Vision.

therefore, the intelligent principle of Whyt - the living principle of Mr Hunter - the anima medica of Stahl - and the vires naturæ medicatrices of Dr Cullen + wholly from my System of Medicine. - Every phenomena animal of life may be ex= =plained by ~~an~~ principles ~~which occur in the books of Bateson~~ those in which there can be no more presumption of intelligence - or ~~a~~ even a consuming principle than there is ~~in them is~~ in Air - fire - & water. -

Should it be asked what is that pe= =liar organization of muscle - nerve - & brain which enables them ~~either~~ to emit ~~effects~~ life when acted upon by Stimuli? - I answer, I do not

know. — The great Creator ~~who~~ has ~~not left himself without~~ established a witness ~~in the natural~~ for himself in every part of the ~~moral~~ natural, as well as the moral World — and by bounding our inquiries, has kindly prevented our forgetting his unsearchable wisdom, or leaning too much ~~to~~ upon the strength of our own ~~intellectual powers~~ understandings. —

Mohamed one said "that he should believe himself to be a God, if he could bring down rain from the clouds, or give life to an animal." It belongs exclusively to the true God ~~of the Christians~~ & sensation so as to endow matter with motion, and to to enable them to produce thought, make it capable under peculiar circumstances of such an organization, as ~~of~~

Upon reviewing the ~~subjects~~ causes of animal life as they have been explained ~~these important observations naturally suggest themselves~~ it appears that the doctrine is not merely speculative, but is of ~~is not only~~ ~~That the theory of animal life is of a speculative nature~~ doubtful ~~It is of~~ immense application ~~in inquiring into the causes & cure of diseases.~~ to Physic? to ~~the~~ pathology & the practice of Physic. ~~This will appear in our future lectures. It is the key stone of the whole in every lecture upon pathology.~~ For

The theory I have delivered effectually cuts the sinews of the vires naturæ medicatrices, ~~It explains these occult powers,~~ and in doing this, it not only removes a large mass of rubbish from medicine, but it removes at the same time one of the foundations of the Epicurean or Atheistical philosophy. Admit ~~a~~ the principle we call - nature to act with intelligence in the human body - and we open a ~~door~~ for ~~the~~ a principle under the

from 130.

to produce ~~producing~~ life ~~under~~ the impression of stimuli.

With this we finish the history of animal life. I ~~have~~ felt as if I had crossed a rapid & dangerous stream. Whether I have gained the opposite shore with my head clean, or covered with mud, and weeds, I leave wholly to your determination.

On animal Heat

go to p: 132.

[In the first view which I supposed myself to have taken of a human Being I was struck not only with his possessing life ~~but~~ which consisted in desition & sensation excited by stimuli, but ~~upon~~ Heat likewise. Upon approaching him I fancied that I took kindly the hand. I found it warmer than

go to p: 131

same name to act in every part of the Universe - to the exclusion of a supreme and eternal Creator. By the theory I have proposed, we render the existence & support of animal life, the immediate act of a supreme Being, by the instrumentality of causes which are constantly under his direction. + Hence it becomes as true in philosophy as it is in religion: "He is indeed the preserver of Men" & "that in him we live & move & have our Being!" - turn over to p. 131. 3.

4. The theory I have delivered reduces the mysterious subject of animal life to a level with many, not only of the operations of Nature, but likewise of Art. It is in every respect as truly mechanical, as the passage of a ship,

or the motions of a ~~wa~~ Mill, under the impulse, or stimulus of ~~the~~ Wind or water. It differs from them only ~~in this~~ in the matter on which the stimuli which produce act, life being of a nature peculiar to itself. —

It is agreeable to trace the ~~by what this theory derives and gives support~~ ~~from its~~ analogy of this theory with the operations of the Will as maintained by Hartley, Edwards & Priestly. Collings — Those writers have clearly proved that ~~motives~~ motives are to the Will what stimuli are to animal matter, and that the notion of the Will possessing a self determining power within itself as absurd as the notions of ~~the~~ vital principles, or of the thinking the healing powers of nature. — Here we may admire the Unity of truth, & the simplicity or Oneness of ~~the~~ the means by which the Creator governs his Universe.

p. 130

! It exhibits a new view of the nervous system by discovering its origin, ~~an~~ in the extremities on which impressions are made, of the nerves, & its termination in the brain. This idea is happily extended by Mr Galli in his treatise upon Animal Electricity.

from the impulses of the winds or tide;
But this theory does more - it prostrates
the mind and body of man at the footstool
in the most humble posture
of ~~the~~ divine power. ~~and thereby~~ - As well
might an oak tree which is tributary
to the earth - to water - to air - and to the heat of
the sun ~~cherish~~ for its ~~as~~ sap and foliage,
~~entertains~~ cherish pride in its existence, as the
creature man, - for he owes his life
every moment to the influences of
causes which ~~are~~ are as much in-
-dependant of ~~beings~~ him, as the elements are
of ~~the existence the thing~~ a common vegetable. ~~It was~~
probably from this view of the dependant
state of animal life in man, that ~~it~~ it is
~~or of~~ compared in the same scriptures to ~~the~~ a
flower - to grass - to a ~~the~~ vapor - & to a weaver shuttle.
~~and~~ all of which show that he exists & thinks
only from necessity, and not from any
inherent principle of life or thought
~~power to~~ J. E.

the heat of the surrounding Atmos=
=phere. upon ~~feeling his face~~ laying
my hand upon his face & breast, I
perceived the same agreeable tempe=
=rature. ~~Upon embracing both~~ In contemplating the
human body we are
~~him, I imagined that he informed~~
~~me that this heat which I and its~~
~~much~~ struck with, its temperature
~~was not only~~
the same in every part, ~~of his body~~ living
~~it~~ with its uniformity
~~but that it was the same~~ in all
by its living stable
seasons & climates, and ~~seldom~~ altered
by ~~the~~ any of the conditions of the
system as they appear in the different
stages of human life. ~~He~~ imagined
~~that~~ he added further, ~~that this heat~~

have said that the Doctrine of Animal life which I have taught is of extensive application in the practice of Physic. — yes Gent: the whole Secret of preserv:ing in all diseases consists in knowing when ~~to abstract, & when to apply Stimuli~~ — in what manner, & in what proportion we are to dimi:nish, or encrease animal life, by the abstraction, ~~or~~ of natural, or by the addition of artificial Stimuli ~~to the body~~ to the whole, or particular parts of the body. However complicated the materia medi:ca ~~has~~ may be, all medicines therefore be classed under two heads, viz: Sedatives & Stimulants — ~~and~~ ~~all~~ for diseases (with a few exceptions)

~~in equal circumstances~~
is ~~the same in every individual of the human race.~~ The business of the present lecture is to inquire into the cause of the phenomena & causes ~~which have been mentioned~~ of animal heat.

Several Hypotheses have been proposed to account for animal heat. I shall mention a few ~~most~~ of them, & then propose a theory which I conceive to be liable to the fewest Objections.

Dr Stevenson has taken a good deal of pains in the 2nd Essays of Edin. to prove that animal heat depends upon a fermentation taking place in the blood, more especially a fermentation of the putrefactive kind. To this I Object

1 That we have no proofs of a fermentation

~~all~~ consist of too much, ~~or too little~~ motion and sensation, or a debility in ~~other words~~ ~~that predisposes to it~~ ~~of too much, or too little animal life~~, either in the whole, or in particular parts of the body. — return to p. 130. n° 3.

∨ a power to resist putrefaction is said to be one of the properties of animal life. —

of any kind going forward in the blood.

2 That a putrefactive fermentation in the blood is incompatible with ~~life~~ health, and ~~pro~~ (beyond a certain degree) with animal life. — It has moreover been fully disproved by the experiments of Dr Lybert. ✓

3 ~~That~~ Putrefaction is not attended w. the generation of any heat. — a Whale in putrefying on the seashore does not ~~emit~~ contain any ~~more~~ heat that what it derives from the surrounding atmosphere. — a human body that perishes with a ~~putrid~~ malignant fever ~~looses~~ loses all its heat ~~as~~ soon after it parts with its life. — Even before death, the heat is often much less than in those fevers in which an ~~putrid~~ gangrenous diathesis has taken place as in Rheumatism & Pleurisy.

The heat, moreover, which is generated in fermentation is confined to its Vinous stage.

4 That all animals which breathe as we do, have the same degrees of heat. Eg: the Elephant & mouse. How this would not be the case, if it depended on putrefaction, — for the heat generated by the passage of bodies to putrefaction is proportioned to the quantity of matter they contain.

A 2d theory ~~Hypothesis~~ which has been proposed is, that Animal heat is generated by the friction of the fluids against the solid parts of the body. Go to p: 130 No 3 [This theory ~~Hypothesis~~ is supported by the phenomenon of heat being frequently connected with the free of the circulation. In Answer to this, Hypothesis I observe 1° That

p: 131 – opposite side.

5 The view of animal life which I have given furnishes a new argument in favor of the the will's acting only from necessity, ~~for the~~ motives being ~~the~~ as much the cause of all its exercises, as stimuli are the cause of animal life. If this were not true, there would be a defect of unity in the plans of the Creator. 6ly & lastly, the doctrine of animal life which has been delivered, leads us to ~~to~~ ~~new views of~~ that sublime & just view of the Deity which is given of him in the Scriptures, viz: as possessing life within himself. ~~To conclude~~

~~principle of life to any other~~ This divine prerogative has never been imparted but to One Being, and that is the Son of God – This appears from that declaration of St John Chap: V. 26 "for as the father hath life in himself, so hath he given to the Son to have life in himself." – hence he is called in the new testament "the life of the world" – "the prince of life", & in many place life itself. – This view of ~~this~~ the independancy of life ~~of the Son of God~~ on circumstances which create & support it in man exalts the Son of God infinitely above simple humanity, and establishes his

divinity from reason as well as from revelation. Truth you see Gent: is an Unit, and the more we discover of it in one branch of knowledge, the more we shall discover of it in Other. Physiology and medicine above all Other sciences, had to just principles in theology, metaphysicks, morals & religion.

6ly The doctrine of animal life which I have taught will enable us to decide upon the long agitated controversy of <u>innate ideas</u>. It leads us to reject them altogether, and to ascribe them wholly to

the influence of external impressions ~~on~~ acting upon a capacity in the mind to receive ideas. ~~I mean~~ ~~two back~~ to ¶

[From these Observations you will perceive that truth is a Unit, and the more we discover of it in One branch of knowledge, the more we shall discover of it in Others. Physiology & medicine above all other Sciences lead to just ~~ideas~~ principles in Theology ~~&c~~ religion morals & metaphysicks] —

In the View which I have given ~~in~~ the Origin of Animal life in man in the Garden of Eden, I ~~mentioned the prob~~ supposed his body to be cold before it was animated by the Air which his Creator breathed into his lungs. No sooner did ~~the~~ these Organs expand and contract alternately, than ~~the~~ a gentle heat was diffused ~~to~~ over every internal and external part of his body. By means of this heat the solid blood was liquified, and the Brain, Nerves and muscles acquired flexibility & irritabi=lity, which prepared them for their im=portant offices in the Animal Oeconomy. Our business at present is to inquire into the ~~origin~~ ~~cause~~ of this heat. For this purpose

V It is no Objection to this Argument that Cream acquires some heat when agitated against the sides of a Churn, ~~but~~ for this depends upon the decomposition or fermentation of the cream in its passage into butter.

heat cannot be produced by friction unless the bodies which act upon each other are uneven. ~~as~~ a fluid ~~whatever~~ never acquires a particle of heat by being shaken in ~~the~~ a Vial. - now the blood vessels we ~~see~~ know have no uneven surfaces, and the par=-ticles of blood have no roughness in them. ✓

2 In producing motion by friction, it is necessary that one of the bodies which is moved should be in a fixed state. a Rope in running ~~this~~ a pulley gene=-rates no heat - for neither of ~~them~~ is at rest. now - we know that neither the bloodvessels, nor the blood in a ~~lie~~ healthy animal are ever at rest - consequently no heat can be produced

~~Tho~~ It is strictly true therefore what is said by the Schoolmen "nil est in intellectu quod non prius fuit in sensu". Were it possible for a child to grow up to manhood without the use of any of ~~its~~ the senses of hearing - seeing - smelling - tasting, and touch - he would not possess a single idea of any material object. He would be with respect to our Globe as destitute of thought as an oak tree. pld

~~Th~~ Ideas excited - they are go back to 7. raw materials - but no idea without impression see. p. 131.

It is a proper test of truth in science to find it accord with Revelation. now it teaches: 1 natural state of man. 2 his life in Xt. 3 the first

on good health & long life – equable temperate &c

& great commandment to love God to be founded in reason considering that he not only originates but supports life.

no objection to this doctrine.

The "creation of a soul as related by moses. It means animal life was infused – or the capacity of body for emitting life was complete.

but: on poisons – illustration &c

q we learn from this doctrine that "semper preservatio, perpetua creatio" – every hour – every moment we are the subjects of creat. power as much as when Adam came out of the hands of his creator. Each spring is a new creation.

see psalm – thou & they die &c